United Nations Educational, Scientific and Cultural Organization

International Institute for Capacity Building in Africa

Strengthening Teacher Development in Africa

2 JULY 2019

Addis Ababa

Basic concepts to design quality classroom-based formative assessment

Education 2030

Basic concepts to design quality classroom-based formative assessment

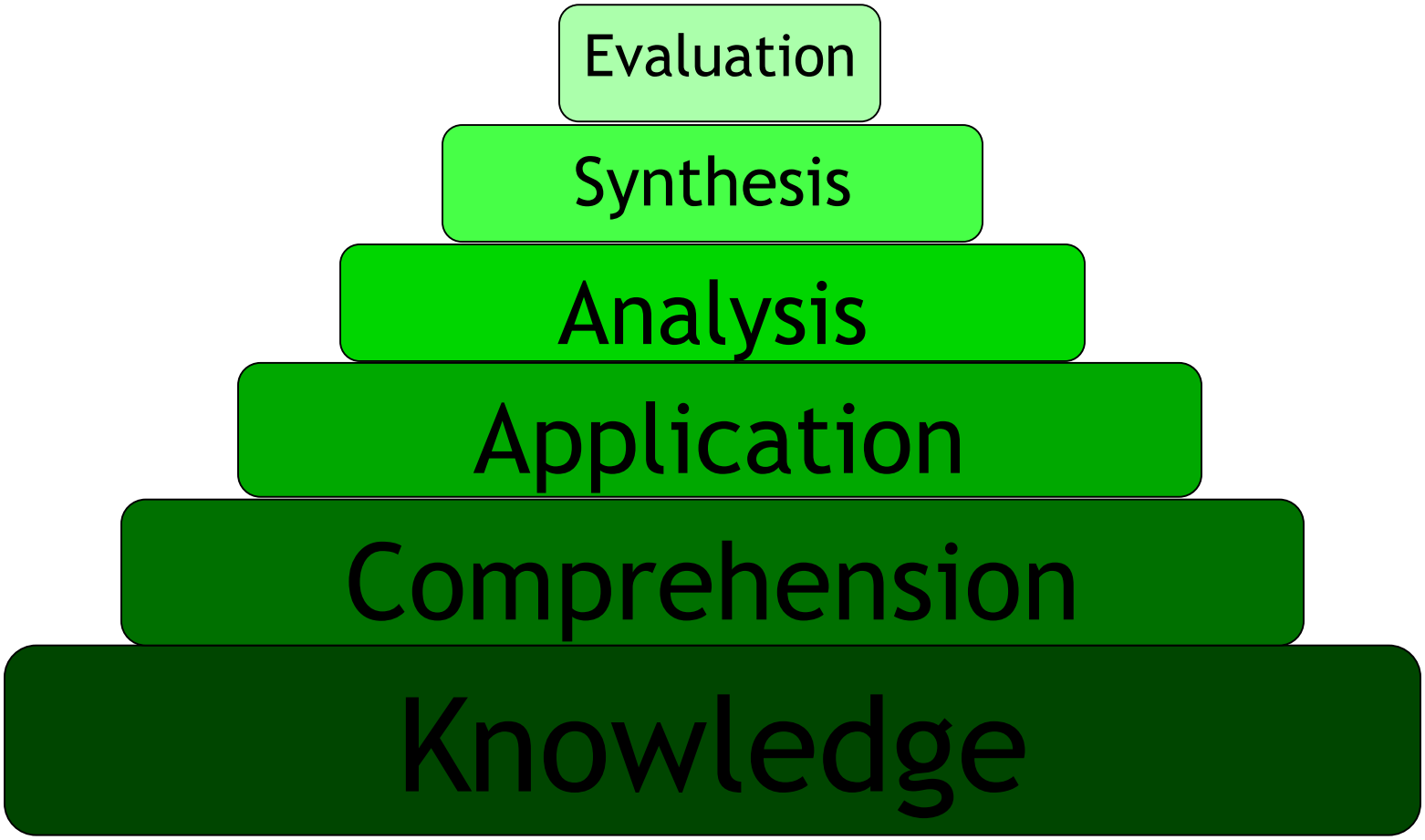
Application of Bloom's taxonomy in classroom assessment

Why set objectives?

1. Help teacher to focus attention and effort
2. Cues for asking questions that stimulate classroom discussion
3. A framework for ensuring that you encourage students' higher-order thinking skills

Bloom's taxonomy

Original



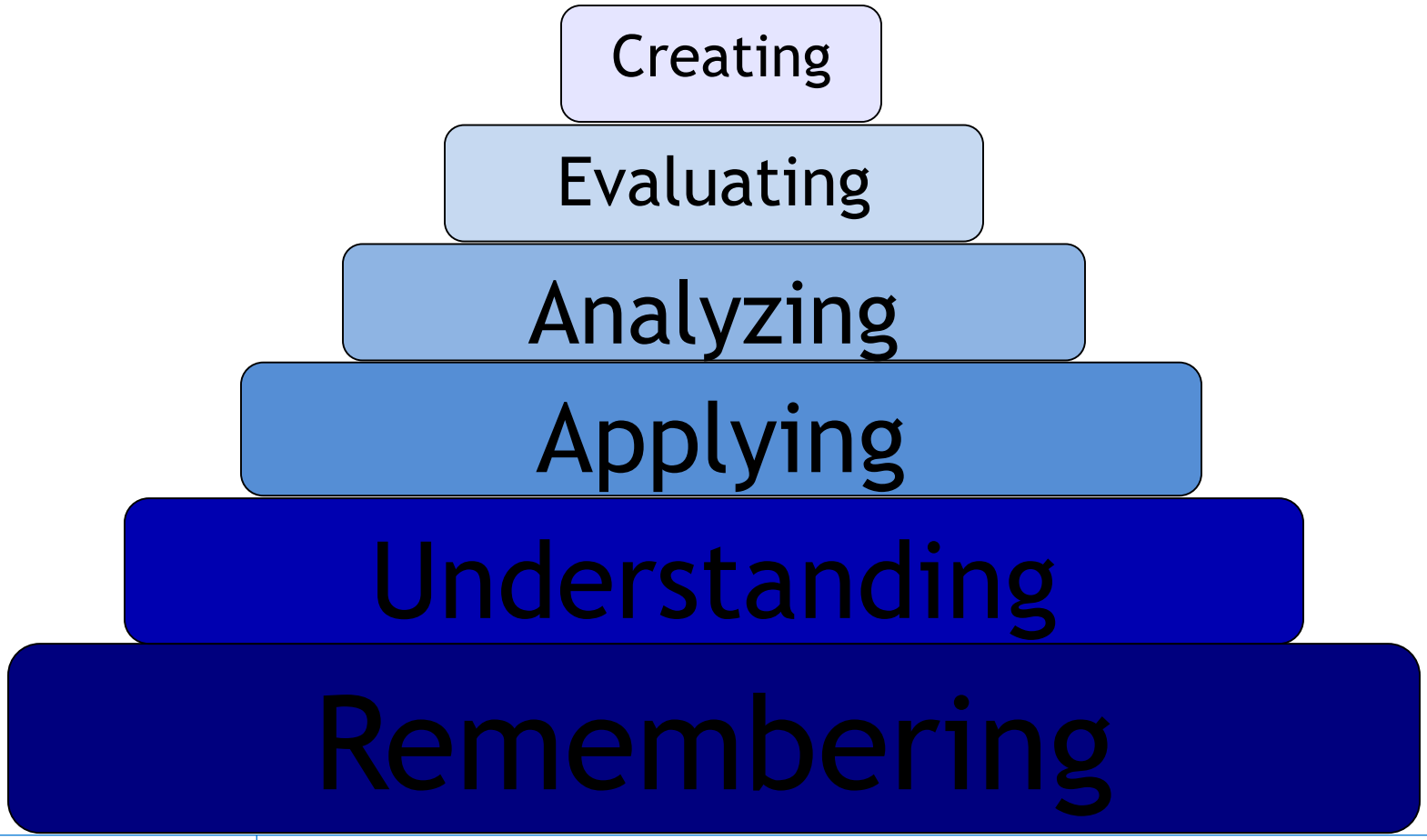
Bloom's taxonomy

Increasing complexity

Categories	Example
Knowledge	Recall specific facts, ideas, or terms
Comprehension	Interpret what learned
Application	Use learned knowledge to solve problems
Analysis	Dismantle concepts
Synthesis	Make predictions
Evaluation	Rate conclusions

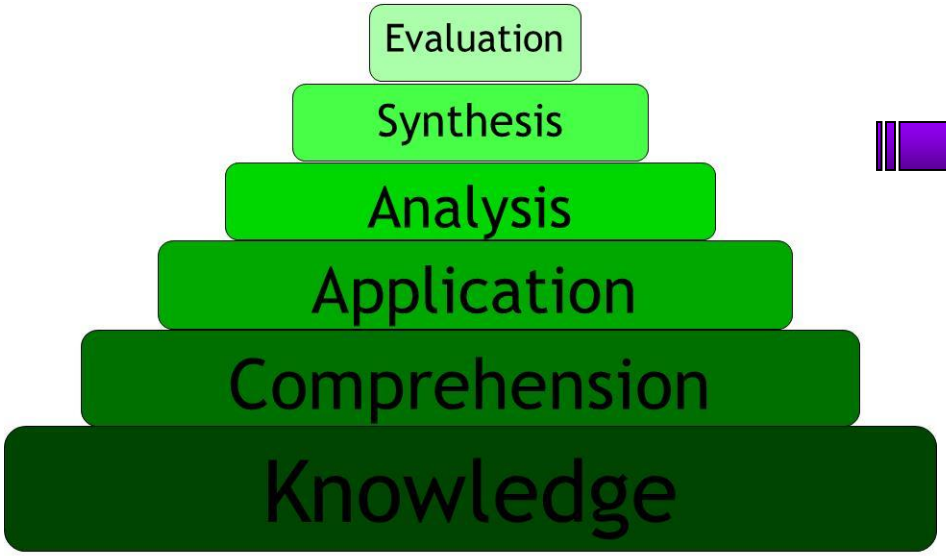
Bloom's taxonomy

Revised

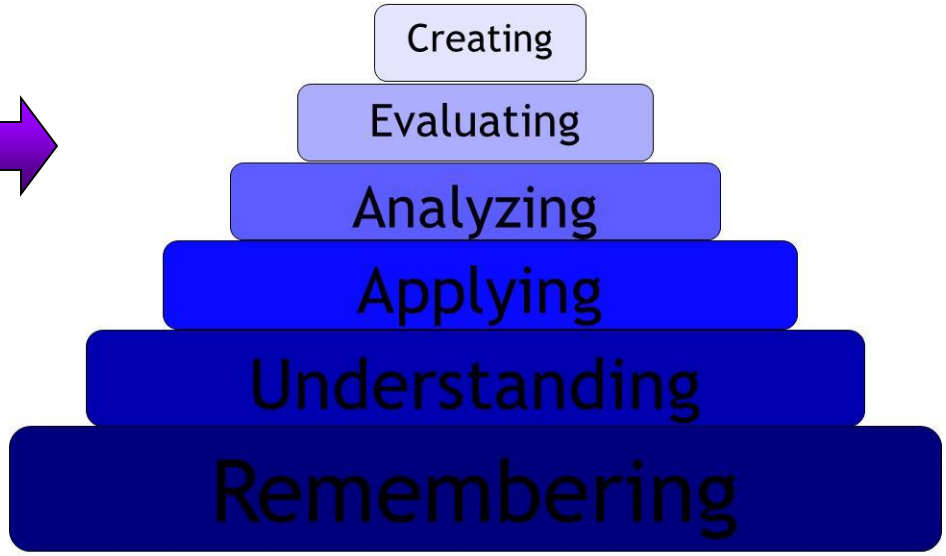


Bloom's taxonomy

Original (Bloom)



Revised (Anderson)



Revised taxonomy: What changed?

Increasing complexity

Original (Bloom)	**Revised** (Anderson)
Knowledge	Remembering
Comprehension	Understanding
Application	Applying
Analysis	Analysing
Synthesis	Evaluating
Evaluation	Creating

Revised taxonomy

Original (Bloom)	**Revised** (Anderson)
Knowledge	Remembering
Comprehension	Understanding
Application	Applying
Analysis	Analysing
Synthesis	Evaluating
Evaluation	Creating

Increasing complexity

Changes

- Titles changed from noun to verb form to reflect the thinking process involved
- Knowledge category renamed and re-organized
- Comprehension and synthesis re-titled
- Order of synthesis (create) and evaluation (evaluate) interchanged
- Knowledge made a separate dimension

Revised taxonomy

		Cognitive Process Dimension					
		Remember	Understand	Apply	Analyze	Evaluate	Create
Knowledge Dimension	Factual Knowledge						
	Conceptual Knowledge						
	Procedural Knowledge						
	Meta-cognition Knowledge						

Cognitive process dimension

1. Remembering

Can the student **recall** information?

Verbs

- Recognise
- List
- Define
- Name
- Describe …

e.g. Name five non-metals.

Cognitive process dimension

2. Understanding

Can the student **explain** ideas or concepts?

Verbs

- Interpret
- Exemplify
- Summarize
- Infer
- Paraphrase …

e.g. Explain why an atom acquire a positive charge after losing an electron.

Cognitive process dimension

3. Applying

Can the student **use** the new knowledge in another familiar situation?

Verbs

- Implement
- Carry out
- Use
- Employ
- Illustrate …

e.g. Use the universal indicator to determine the pH of substance x.

Cognitive process dimension

4. Analysing

Can the student **differentiate** between constituents and parts?

Verbs

- Compare
- Attribute
- Deconstruct
- Organize
- Examine…

e.g. Distinguish between cations and anions in chemical reactions.

Cognitive process dimension

5. Evaluating

Can the student **justify** decision or course of action?

Verbs

- Check
- Critique
- Judge
- Revise
- Rate …

e.g. Why dip a litmus paper in water before using it to test the level of acidity of a solid substance?

Cognitive process dimension

6. Creating

Can the student **generate** new products, ideas or ways of viewing things?

Verbs

- Design
- Construct
- Plan
- Produce
- Build …

e.g. Prepare a new acid/base indicator and design a colour chart for it.

Knowledge dimension

A). Factual knowledge

The basic elements student must know to be acquainted with a discipline or solve problem in it.

Sub-types

Knowledge of

- terminology
- specific details and elements

e.g. Metals, no-metals, gas, solid …

Knowledge dimension

B). Conceptual knowledge

The interrelationships among the basic elements within a larger structure that enable them to function together.

Sub-types

Knowledge of

- Classification and categories
- Principles and generalizations
- Theories, models and structures

e.g. Halogens, alkali metals, reactivity tables …

Knowledge dimension

C). Procedural knowledge

How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods

Sub-types

Knowledge of

- Subject-specific skills and algorithms
- Subject-specific techniques and methods
- Criteria for determining when to use appropriate procedure

e.g. Flame test, litmus test, separation methods …

Knowledge dimension

D). Metacognitive knowledge

Knowledge of cognition in general as well as one's own cognition

Sub-types

- Strategic knowledge
- Knowledge about cognitive task
- Self knowledge

e.g. Awareness of own knowledge

Objective
The student will learn to employ the fractional distillation separation technique.

Noun
the fractional distillation separation technique

Verb
Employ

Knowledge dimension

Cognitive process dimension

		Cognitive Process Dimension					
		Remember	Understand	Apply	Analyze	Evaluate	Create
Knowledge Dimension	Factual Knowledge						
	Conceptual Knowledge						
	Procedural Knowledge			X			
	Meta-cognition Knowledge						

The student will learn to employ the fractional distillation separation technique.

		Cognitive Process Dimension					
		Remember	Understand	Apply	Analyze	Evaluate	Create
Knowledge Dimension	Factual Knowledge	List					
	Conceptual Knowledge	Describe					
	Procedural Knowledge	Tabulate					
	Meta-cognition Knowledge	Appropri ate use					

Reference

- Bloom, Benjamin S. (Ed). Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I. Cognitive Domain (pp. 201-207). New York: McKay. 1956.
- Anderson, L.W., & Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives: Complete edition, New York: Longman

Thank you

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